

Application/Control Number: 09/904,929

Page 2

Art Unit: 2142

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1. An industrial control system interface comprising:

(a) a first interface program executing on a remote computer to provide an interface screen for an industrial controller;

5 (b) a second interface program executing on a Web server communicating with the remote computer over the Internet and further communicating with an industrial control system controlling an industrial process through input and output data communicated with the industrial process; and

wherein the first and second interface program execute to provide a protocol so that the first interface program may discover and instance software objects related to the
10 input and output data and stored on the Web server;

whereby the first interface program may use pre-written software objects to implement the interface.

2. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the protocol provides for the communication of instructions between the first interface program and the second interface program using the SOAP protocol.

3. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein multiple instructions are transmitted in a single SOAP protocol message and wherein [the] a call arrangement of the SOAP protocol is selected from the group consisting of sequential, nested, and a combination of both.

4. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the SOAP protocol provides for a discovery instruction to be transmitted from the first interface program that causes the second interface program to provide a list of characteristics of the software objects.

5. (Amended) [The method of claim] The industrial control system interface of claim 4 wherein the characteristics are object properties, object constructors, object methods and object events.

6. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the protocol provides for a constructor instruction creating an instance of a software object on the Web server.

7. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the protocol provides for a set property instruction setting a property of a software object on the Web server.

8. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the protocol provides for an invocation of a method of a software object on the Web server.

9. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the protocol provides for an event subscription instruction causing the receipt by the first interface program of event messages from software objects on the Web server.

10. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the protocol provides for at least one persistence instruction preserving an instance of a software object on the Web server [during] after a cessation of a communication session on the Internet between the remote
5 computer and the Web server.

11. (Amended) [The method of claim] The industrial control system interface of claim 1 [including the steps of] wherein the first and second programs further execute to:

[(a) connecting] (i) connect the remote computer via a Web browser program
5 to a first Web page providing the first interface program;

[(b) reading] (ii) read the first interface program into the remote computer and [executing] execute it at the remote computer; and

[(c) connecting] (iii) connect the Web browser program to the Web server communicating with the industrial control system.

12. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the first web page is on a Web server other than the Web server communicating with the industrial control system.

13. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the first interface program is a Java applet.

14. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the software objects stored on the Web server include
graphic display elements.

15. (Amended) [The method of claim] The industrial control system interface of claim 1 wherein the software objects stored on the Web server include [a] graphic control elements.

16. (New) An industrial control system interface comprising:

(a) a first interface program executing on a remote computer to provide an interface screen for an industrial controller;

5 (b) a second interface program executing on a Web server communicating with the remote computer over the Internet and further communicating with an industrial control system controlling an industrial process through input and output data communicated with the industrial process;

wherein the first and second programs execute to:

10 (i) connect the remote computer via a Web browser program to a first Web page providing the first interface program;

(ii) read the first interface program into the remote computer and execute it at the remote computer; and

(iii) connect the Web browser program to the Web server communicating with the industrial control system.

17. (New) The industrial control system interface of claim 16 wherein the first web page is on a Web server other than the Web server communicating with the industrial control system.

18. (New) The industrial control system interface of claim 16 wherein the first interface program is a Java applet.

19. (New) The industrial control system interface of claim 1 wherein the software objects stored on the Web server include graphic display elements.

20. (New) The industrial control system interface of claim 19 wherein the software objects stored on the Web server include graphic control elements.

21. (New) A method of remote communication with an industrial control system comprising the steps of:

(a) executing a first interface program on a remote computer to provide an interface screen for an industrial controller;

5 (b) executing a second interface program on a Web server communicating with the remote computer over the Internet and further communicating with an industrial control system controlling an industrial process through input and output data communicated with the industrial process; and

10 wherein the first and second interface programs further execute to provide a protocol so that the first interface program may discover and instance software objects related to the input and output data and stored on the Web server;

whereby the first interface program may use pre-written software objects to implement the interface.

22. (New) The method of claim 21 wherein the protocol provides for the communication of instructions between the first interface program and the second interface program using the SOAP protocol.

23. (New) The method of claim 21 wherein multiple instructions are transmitted in a single SOAP protocol message and wherein a call arrangement of the SOAP protocol is selected from the group consisting of sequential, nested, and a combination of both.

24. (New) The method of claim 21 wherein the SOAP protocol provides for a discovery instruction to be transmitted from the first interface program that causes the second interface program to provide a list of characteristics of the software objects.

25. (New) The method of claim 24 wherein the characteristics are object properties, object constructors, object methods and object events.

26. (New) The method of claim 21 wherein the protocol provides for a constructor instruction creating an instance of a software object on the Web server.

27. (New) The method of claim 21 wherein the protocol provides for a set property instruction setting a property of a software object on the Web server.

28. (New) The method of claim 21 wherein the protocol provides for an invocation of a method of a software object on the Web server.

29. (New) The method of claim 21 wherein the protocol provides for an event subscription instruction causing the receipt by the first interface program of event messages from software objects on the Web server.

30. (New) The method of claim 21 wherein the protocol provides for at least one persistence instruction preserving an instance of a software object on the Web server after a cessation of a communication session on the Internet between the remote computer and the Web server.

31. (New) The method of claim 21 including the steps of:

(c) connecting the remote computer via a Web browser program to a first Web page providing the first interface program;

(d) read the first interface program into the remote computer and [executing]
5 execute it at the remote computer; and

(e) connect the Web browser program to the Web server communicating with the industrial control system.

32. (New) The method of claim 21 wherein the first web page is on a Web server other than the Web server communicating with the industrial control system.

33. (New) The method of claim 21 wherein the first interface program is a Java applet.

34. (New) The method of claim 21 wherein the software objects stored on the Web server include graphic display elements.

35. (New) The method of claim 21 wherein the software objects stored on the Web server include a graphic control elements.